



DEPARTMENT OF TRANSPORTATION  
HAZARDOUS MATERIALS REGULATIONS BOARD  
WASHINGTON, D.C. 20590

2768

[Docket No. HM-102; Amdt. Nos. 172-23,  
173-78, 174-19, 177-29]

**FLAMMABLE, COMBUSTIBLE, AND  
PYROPHORIC LIQUIDS, DEFINITIONS**

The purpose of this amendment to the Department's Hazardous Materials Regulations is to:

1. Specify a new definition for the class of materials identified as "Flammable liquid";
2. Create and define a new class of materials identified as "Combustible liquid";
3. Modify the definition for Pyrophoric liquids within the flammable liquid class; and
4. Set forth the requirements for the materials that are covered by the new definitions.

On June 15, 1972, the Board published a notice of proposed rule making, Docket No. HM-102 (37 FR 11898), proposing the new definitions. Consolidated within the notice were matters previously covered by Docket Nos. HM-3 (33 FR 3382), HM-42 (35 FR 3298), and HM-67 (35 FR 18534). Interested persons were invited to participate in this rule making proceeding and all comments received have been given full consideration by the Board before it decided on the amendments made herein.

A large number of comments were received by the Board. Many commenters, principally from fire service organizations, requested that the Board take no action that would have an adverse effect on the standards set forth in National Fire Protection Association (NFPA) Standard No. 30. The NFPA's definition for flammable liquids included those liq-



uids having flash points below 140°F. (closed cup) for several years. The Board assumes that the commenters were not aware that, to the present time, the Department's regulations in 49 CFR 170-189 do not cover liquids having flash points higher than 80° F. (open cup), and that the proposal in Notice 72-7 was to raise the definition from 80° F. (open cup) to 100° F. (closed cup). Also the Board has been advised that the NFPA has modified its definition of flammable liquids to be consistent with the proposals made by the Department of Transportation and the Department of Labor.

Other commenters presented diverse viewpoints ranging from full support of the proposal to total objection. The Board agrees that several of the objections made are valid and adjustments have been made accordingly. Particular areas which the Board believes should be discussed in detail are covered in the following paragraphs:

1. A commenter recommended that the new definition for flammable liquid specify that materials defined as compressed gases are not included. This has been done, and an appropriate change has been made to recognize the division between the definition in § 173.115 and the definition specified in § 173.300.

2. Several commenters expressed their views that the Board should give special consideration to materials completely miscible with water. Particular concern was addressed to the effect the new definition would have on materials such as distilled spirits and a number of household products. The Board believes it is making proper provision for these materials within the partial exemption provisions, including marking, labeling, and specification packaging, when their flash points are 73°F. (closed cup) or higher.

3. When the conversion to 73°F. closed cup was selected, the Board believed that there were very few materials having open-cup flash points higher than 80°F. that have closed-cup flash points lower than 73°F. The closed cup flash point of 140 proof spirits, which involves several millions of gallons stored and transported in barrels, is close to 73°F.; therefore, the Board believes it should specify the flash point demarcation for these materials due to the confusion that could exist because of very slight deviations in test results from laboratory to laboratory.

4. A number of commenters expressed concern over the testing requirements specified for materials having a viscosity of 45 S.U.S. or more at 100° F. They pointed out that, in some instances, use of the Pensky-Martens Closed Tester would not be appropriate. The Board agrees that there are some materials for which the Pensky-Martens Tester would be inappropriate and believes that some flexibility should be provided in this area to allow alternate test methods. Therefore, the requirement has been modified to permit use of other test methods as authorized in Note 1 of ASTM Standard D93-71. Further, the Board has been ad-

vised that a number of testing procedures are presently under review by experts involved in ASTM standardization procedures. The Board will give full consideration to any petition for a change in its reference to ASTM D93 if it is modified in the future.

5. Several commenters questioned the double testing of mixtures having different volatility and flash points. It was pointed out that a second test should be unnecessary when the first test discloses a material has a flash point in the lowest regulated range. Since the lowest regulated range is applied to materials having flash points of 20° F. or lower, the requirement has been changed to make it clear that once a material has been tested and found to have a flash point of 20° F. or lower, a second test is not required. It was also pointed out that there is no need to specify the temperature at which a material is evaporated and all that is necessary is to specify that a certain portion of a material shall be evaporated. The Board agrees and a change has been made accordingly.

As stated earlier in this preamble, this rule making proceeding incorporates matters covered by three other rule making proceedings. With the proposals made in Docket Nos. HM-67 and HM-102 pertaining to modifications of § 173.119(b) and (L) and the proposals made in Notice 70-3 (HM-42), the application of the new requirements for flammable and combustible liquids have been proposed and are being adopted by the Board in this amendment with certain exceptions. The application of these regulations based on the size of packaging and flash point is as follows:

1. A provision is added to § 173.118 to provide partial exemption for materials having flash points between 73° and 100° F. when in packagings having a rated capacity of 1 gallon or less.

2. Specification packaging is not being required for a flammable liquid having a flash point of 73° F. or higher closed cup when in a packaging having a capacity of 110 gallons or less.

3. For transportation by highway and rail, a combustible liquid will not be subject to the regulations when in a packaging having a rated capacity of 110 gallons or less.

Interested persons should note that there is another rulemaking action, Docket No. HM-112, in progress which relates to this amendment. (See page 3022 of this issue of the FEDERAL REGISTER.) That notice refers to the application of the regulations pertaining to flammable and combustible liquids aboard aircraft and vessels. These regulations will not apply to water transportation because the Coast Guard has determined that its statutory authority does not allow this change in flash point. The Coast Guard is considering an amendment to 46 U.S.C. 170 to remove the restrictions which prevent the Coast Guard from adjusting the flash point.

On April 24, 1973, the Board published a notice entitled "Request for Informa-

tion for Environmental Impact" (38 FR 10118) in response request from the Association of Railroads (AAR) that the Board consider an environmental impact statement. The Board has received comments from the AAR, and comments were received, one of which was the comments of the AAR and the comments of the AAR and the comments of the AAR. After considering the issue and after the comments received, the Board believes that no statement is necessary cause the adoption of this amendment will not have a significant impact on the environment. The AAR argues that the adoption of this amendment would "drastically" increase the number of commodities subject to regulation that the amendment would expand the list of newly regulated commodities to include restrictive railroad operating rule (3) that restrictive railroad procedures would cause a shift in the usual means of transportation for newly regulated materials from highway; and (4) that this shift would cause an increase in pollution use. The AAR also argued that the amendment would cause an increase in the number of required rail cars, increased fuel consumption and for accidents, and longer train.

The Board believes the comments were addressed primarily to the proposed combustible liquids (3) and the Board shares the AAR's concern for the environment and appreciates the extensive efforts that went into the presentation; however, the Board does not agree that regulations on combustible liquids it is adopting for rail will have a significant impact on the environment. The requirements for rail and highway were essentially the same, i.e., marking, placarding, papers, and accident reporting. It is difficult to see how such requirements would cause a shift of traffic from highway thereby causing an increase in pollution.

It is also difficult to see the impact of the amendment as it was proposed by the United States "brink \* \* \* of bankruptcy" in respect to its international trade. A second commenter favoring the amendment claimed. As to the rule being adopted in this rule making, the Board simply wishes to state that the inclusion of combustible liquids and additional flammable liquids in the regulations primarily involve requirements for identification of the potential hazards of flammable liquids and combustible liquids. Also, flammable liquids having flash points of 73° F. or higher in packaging of less than 110 gallons and combustible liquids are exempt from specification packaging.

As stated in the preamble of the Proposed Rule Making for this amendment, the Board is providing approximately one year to accomplish compliance with the requirements of this amendment. The Board provides that immediate compliance is authorized except as they relate to the placarding of tank cars.



consideration of the foregoing, Parts 173, 174, and 177 of this title are amended as follows:

**PART 172—LIST OF HAZARDOUS MATERIALS CONTAINING THE SHIPPING NAME OR DESCRIPTION OF ALL MATERIALS SUBJECT TO PARTS 170-189 OF THIS SUBCHAPTER**

(A) In § 172.4, paragraph (a) is amended by adding the following abbreviation as the seventh line:

**§ 172.4 Explanation of signs and abbreviations.**

(a) \* \* \*

Combustible liquid----- Comb. L----- 3

(B) In § 172.5 paragraph (a), the List of Hazardous Materials is amended as follows:

**§ 172.5 List of hazardous materials.**

(a) \* \* \*

greater or less than indicated by the results of the tests specified in paragraph (a) of this section, the Department may revise its classification or make the material subject to the requirements of Parts 170-189 of this subchapter.

NOTE 1 [Deleted]

(C) In § 173.118, the heading is amended; paragraphs (a) (3), (b), (c), and (d) are added to read as follows:

**§ 173.118 Exemptions for flammable and combustible liquids.**

(a) \* \* \*

(3) In inside packaging having a rated capacity of one gallon or less when packed in strong outside packaging. The provisions of this partial exemption apply only to a material having a flash point of 73° F. or higher if its flash point is marked on the outside of the package.

(b) A flammable liquid having a flash point of 73° F. or higher is not subject to the specification packaging requirements of this Part when in a packaging having a capacity of 110 gallons or less. The provisions of this paragraph apply only if the flash point of the material is marked on the outside of the package.

(c) Combustible liquids in portable tanks, cargo tanks, or tank cars are exempt from the requirements of this subchapter except those that pertain to:

(1) Shipping papers, waybills, switching orders or other billing,

(2) Marking of portable tanks,

(3) Marking or placarding rail cars and motor vehicles, and

(4) Reporting incidents as prescribed in §§ 171.15 and 171.16 of this subchapter.

(d) The requirements of this subchapter do not apply to combustible liquids in packagings having capacities of 110 gallons or less.

(D) In § 173.119, the introductory text of paragraphs (b) and (l) is amended to read as follows:

**§ 173.119 Flammable liquids not specifically provided for.**

(b) *Flammable liquids with flash points above 20° F. to 73° F.* Flammable liquids with flash points above 20° F. to 73° F. and having vapor pressure (Reid<sup>1</sup> test) not over 16 pounds per square inch, absolute, at 100° F. other than those for which special requirements are prescribed in this Part, must be packaged in packagings of a design and constructed of materials that will not react dangerously with or be decomposed by the chemical packed therein, as follows (see paragraphs (c) through (i) of this section for high-pressure liquids and paragraph (m) of this section for flammable liquids which are also oxidizing materials or corrosive liquids):

(1) *Viscous flammable liquids with flash point above 20° F. to 73° F. and having a vapor pressure which does not exceed 18 pounds per square inch, absolute,*

<sup>1</sup> ASTM Test D323.

Article	Classed as—	Exemption and packing (see sec.)	Label required if not exempt	Maximum quantity in 1 outside container by rail express
Combustible liquid, n.o.s.-----	Comb. L-----	173.118, 173.119		

**PART 173—SHIPPERS**

(A) In Part 173 Table of Contents, §§ 173.115 and 173.118 are amended to read as follows:

- Sec.  
173.115 Flammable and combustible liquids; definition.  
173.118 Exemptions for flammable and combustible liquids.

(B) In § 173.115, the heading, paragraphs (a) and (c) are amended; Note 1 following paragraph (c) is deleted as follows:

**3.115 Flammable and combustible liquids; definition.**

(a) For the purposes of Part 170-189 of this subchapter:

(1) "Flammable liquid" means any liquid having a flash point below 100° F. (37.8° C.) that does not meet one of the definitions specified in § 173.300.

NOTE 1: For the purpose of the regulations in this subchapter any mixture having one component or more with a flash point of 100° F. (37.8° C.) or higher, that makes up at least 99 percent of the total volume of the mixture is not considered to be a flammable liquid.

NOTE 2: For the purposes of the regulations in this subchapter, distilled spirits of 140 proof or lower are considered to have a flash point no lower than 73° F.

(2) "Combustible liquid" means any liquid having a flash point at or above 100° F. (37.8° C.), and below 200° F. (93.3° C.)

NOTE 1: For the purposes of the regulations in this subchapter any mixture having one component or more with a flash point at 200° F. (93.3° C.) or higher, that makes up at least 99 percent of the total volume of the mixture is not considered to be a combustible liquid.

NOTE 2: The limit of 200° F. is a limitation of the application of the regulations in Parts 170-189 of this subchapter and should not be construed as indicating that liquids with higher flash points are not flammable (when transported at elevated temperatures) or combustible. Markings such as "Nonflammable" or "Noncombustible" should not be on a vehicle containing a material that has a flash point of 200° F. or higher.

(3) "Flash point" means the minimum temperature at which a liquid gives off

vapor within a test vessel in sufficient concentration to form an ignitable mixture with air near the surface of the liquid and shall be determined as follows:

(i) For a liquid that has a viscosity of less than 45 S.U.S. at 100° F. (37.8° C.), or that does not contain suspended solids, and does not have a tendency to form a surface film while under test, the procedure specified in the Standard Method of Test for Flash Point by Tag Closed Tester (ASTM D56-70) shall be used.

(ii) For a liquid that has a viscosity of 45 S.U.S. or more at 100° F. (37.8° C.), or that contains suspended solids, or that has a tendency to form a surface film while under test, the procedures specified, or alternate tests authorized, in the Standard Method of Test for Flash Point by Pensky-Martens Closed Tester (ASTM D93-71) shall be used.

(iii) For a liquid that is a mixture of compounds that have different volatility and flash points, its flash point shall be determined as specified in paragraph (a) (3) (i) or (ii) of this section on the material in the form it is to be shipped. If it is determined by this test that the flash point is higher than 20° F. (-6.67° C.), a sample of the liquid, evaporated to 90 percent of its original volume, shall be tested. The lower value of the two tests shall be the flash point of the material.

(4) "S.U.S." means Saybolt Universal Seconds as determined by the Standard Method of Test for Saybolt Viscosity (ASTM D88-56) and may be determined by use of the S.U.S. conversion tables specified in ASTM Method D2161-66 following determination of viscosity in accordance with the procedures specified in the Standard Method of Test for Viscosity of Transparent and Opaque Liquids (ASTM D445-65).

(5) "Pyrophoric liquid" means any liquid that ignites spontaneously in dry or moist air at or below 130° F. (54.5° C.).

NOTE 1: The Bureau of Explosives is equipped to test samples of flammable liquids to determine whether or not they are pyrophoric.

(c) If experience or other data indicate that the hazard of a material is



at 100° F. Viscous flammable liquids with flash point above 20° F. to 73° F. and having a vapor pressure which does not exceed 18 pounds per square inch, absolute, at 100° F. must be packaged as follows:

(E) In § 173.401, paragraph (a) (2) is added to read as follows:

§ 173.401 Hazardous materials.

(a) \* \* \*

(2) Each portable tank, having a rated capacity of more than 110 gallons, used for the transportation of combustible liquids must be marked "COMBUSTIBLE LIQUID" in letters at least 2 inches high.

PART 174—CARRIERS BY RAIL FREIGHT

(A) In § 174.541, paragraphs (a) (2), and (3) are amended to read as follows:

§ 174.541 "Dangerous" placards, "Dangerous—Radioactive material" placards; or "Caution—Residual phosphorus" placards.

(a) \* \* \*

(2) Cars containing flammable solids, oxidizing materials, or poisonous solids (Class B), in bulk; or combustible liquids in packagings exceeding 110 gallons rated capacity.

(3) Tank cars containing flammable liquids, combustible liquids, flammable solids, oxidizing materials, corrosive liquids, poisonous liquids or solids, Class B, flammable compressed gases, or non-flammable compressed gases.

(B) § 174.584 paragraph (a), the Table is amended as follows:

§ 174.584 Waybills, switching orders, or other billing.

(a) \* \* \*

	Label notation to follow entry of the article on the billing	Placard notation to follow entry of the article on the billing	Placard endorsement must be 3/8" high and appear on the billing near the space provided for the car number
For combustible liquid.....	None.....	"Dangerous Placard".	"Dangerous".

PART 177—SHIPMENTS MADE BY WAY OF COMMON, CONTRACT, OR PRIVATE CARRIERS BY PUBLIC HIGHWAY

In § 177.823 paragraph (a) (1), the table is amended by adding as the fifth entry the following:

§ 177.823 Required marking on motor vehicles and combinations.

(a) \* \* \*

(1) \* \* \*

Commodity	Type of marking or placard
Combustible liquid— in packagings exceeding 110 gallons rated capacity.	COMBUSTIBLE or FLAMMABLE (red letters on white background).

This amendment is effective January 1, 1975. However, immediate compliance with the regulations, as amended herein, is authorized except as they pertain to the placarding of tank cars containing combustible liquids.

(Secs. 831 to 835, 18 U.S.C.; sec. 9, Department of Transportation Act (49 U.S.C. 1657); Title VI, sec. 902(h), Federal Aviation Act of 1958, U.S.C. 1421-1430, 1472(H), 1655(c))

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